MID-FLORIDA ATARI COMPUTER CLUB BULLETIN

JUNE 1995----------SPECIAL EDITION----------Vol. 12, No. 6

The Minutes for May

By Bill Baker, Acting Secretary, in place of Actual Secretary

It was a beautiful Sunday afternoon. 15:12 by the old clock in the city Hall tower. The sun was shining, the birds were singing. No one knew that high in the ramparts of the city library building, (third floor to those of you who have never been there), a small group of dedicated Atarians were once more plotting the overthrow of Big Blue!

Sound exciting? Well, I thought so too, and as I looked around the room at the nine dedicated members in attendance (don't stand up, you know who you are), I wondered where the heck YOU were. I know one of us was supposed to call...(In fact some were called twice, because of the first Sunday switch for Mother's Day. (You do remember Mother, don't you? Short, white hair, little apron, carries a 38 Smith and Wesson?) Oh, well, back to the minutes...

We discussed how the articles in the newsletter will still continue to contain information on the care and feeding of the eight bit system, and a continuing plea was made for the rest of us to join THE HARDY FEW regularly submitting. Bob mentioned that the first segment of our how to keep your computer happy tape was available for any one wanting a copy. (This part shows how to clean your 8-bit or ST drive. Additional how to service sessions will be forthcoming.

Discussion was then held on the many new networked message bases recently added to Inner Core, including a quite active 8-bit base. 40 clubs, six of whom are overseas are now contributing to the BBS. The meeting was adjourned promptly at 15:27 and we got on to the serious business of weatching our demos (INSERT DEMO DATA HERE). Both Jim Halcrow and Bill Baker renewed membership before we left, and I hope you will, too, if June is your due month, so you can vote for me for President. Remember, it's a new year for us, and we want to make it a great year for Mid Florida.

Respectfully submitted in the abscence of our "regular" secretary, who'd rather be engineering a train right now,

Bill Baker
(candidate of the "FROM THE FLOOR PARTY" for the office of Presidente, El Jeffe, Great Chief of the Fire, Wizard Extraordinair"

DISK OF THE MONTH - JUNE, 1995

By Bob Smith

This month the DOM will have utilities that will be of use to most everyone. I will review two of them in depth, however, there are quite afew others on the disk and I will briefly describe a few of them for you.

This program will provide you with a way of making text files into ASCII, 8 Bit text files into ST files, ST files into 8 Bit text files and much more. It is ready to run and all you have to do is just click on it and then follow the complete menu. It is self-explanatory.

IBMDRIVE

This collection will tell you exactly how to connect a standard 3.5 or 5.25 IBM drive to your ST. You will be provided with complete text files, pictures, and program files to help connect and run the drives. This is great for anyone with access to this type of equipment. An especially cheap back up are the 5 1/4 disks that are available.

The following reviews of Boot Manager and Inspec round out this month's column. Please let the ST Librarian know if you have any problems with this disk.

BOOT MANAGER

This Disk of the Month selection for June, 1995, is Boot Manager, Version 1.2 and is written by Radoivich Nenos. Now that is a name that takes some practice, but his program does not. (Incidentally, this package comes from Greece.)

INTRODUCTION

The idea for writing this program came to the author because he had a hard disk and became really bored renaming, erasing and copying files each time he wanted to change the setup inside the AUTO folder and accessories. So here is the program that will allow you to choose from a list of programs and accessories that you have installed inside a predefined folder for AUTO and another for the accessories. It will show you which one is already set to run and which one is not and it will allow you to change any of them.

HARDWARE

This program should run on any Atari platform up to and including the Falcon. The author states that memory and TOS configurations should not be a problem and it requires very little of memory on boot up.

INSTALLATION

(A Note Of Caution: Do not change the config file with a plain text editor.

When you unzip the ZIP file, you will find the following files :

BOOTMGR.PRG : The main program.
SETUP.PRG : The set-up program.
BOOTMGR.CFG : An example config file.
BOOTMGR.DOC : The Documentation from which this article is taken.

After unziping you will have to decide in which folder you want

current AUTO folder to AUTO.PRG and then create a new AUTO folder, where you must copy the BOOTMGR.PRG to. After that, you can copy any file intended to be an auto program to the choosen folder (C:\AUTO.PRG\) and leave it waiting there until you need it.

Create a folder that will contain your accessories (in the example file it's 'C:\ACC.PRG') and copy any accessory you desire to that folder.

The next step is to run the SETUP.PRG and answer the questions which are:

1. The amount of seconds to wait before (auto) booting without changing anything (in the example file it's 5 sec.).

2. The complete path where the AUTO folder with all the programs you use is located. (In the example file it's 'C:\AUTO.PRG\').

3. The complete path where your AUTO folder is (including the AUTO word, in the exapmle file it's 'C:\AUTO\')

4. The complete path where the folder containing your accessories are (in the example file it's 'C:\ACC.PRG\')

5. Your root path of your boot drive (in the example file it's 'C:\')

If everything goes well, copy the file BOOTMGR.CFG to your root directory of the boot drive. If the examples suits you, you can just rename then and copy the example file to the root directory.

USING THE PROGRAM

The first thing that appears on your screen is a message that prompts you to press a key to stop the countdown and under it the current time and the time at which your Atari will boot.

If you have pressed a key, the program will first present you with a list of all of the programs in the folder you have choosen for AUTO's. The ' > ' in front of a file means that the program is already in your AUTO folder, ready to run.

Your current position is in a different color than the rest, use your cursor keys to move thru them and pressing the 'space' key will either disable it, if it is enabled, or enable it, if it is disabled. By hitting the 'Esc' key, the program will proceed to do all of the erasing and copying that it has to do. Finally, by pressing the 'Undo' key, the program will exit and do nothing (same as leaving the timer to exceed it's limit).

Please refer to the documentation for the complete descriptions and instructions on how to use this program, but, this is a definite addition that should be in your collection.

(Editor's note: As with any such program, the staff of the Newsletter or the Officers and the Mid-Florida Atari Computer Club cannot be responible for any problems that may occur.

INSPEC

INSPEC is a program to look into sectors of floppy or hard disks, and into files, especially if they contain numbers instead of

It is NOT a disk monitor, it allows only listing (also on a protocol file), but no changing of the data in a file or at an absolute position of a disk.

INSPEC is key-driven. The meaningful keys are always displayed, and a short explanation is given, when the ? key is pressed.
The I key ("interpret") allows interpreting directory sectors, floppy & harddisk boot sectors, and changing display format (integers, MS-DOS- integers...) in a separate menu. The Q key ("quit") returns to the main menu and from there to the shell (desktop).

Useage:
1) activate the program INSPEC.TOS (from desktop or other shell)
2) when prompted, give a protocol file name (may be PRT: for immediate printing), or press RETURN to get output on display screen
3) when prompted for a file name, enter the name of the file to be inspected. If you don't want to see a file, but rather some sectors of a device, simply press RETURN without entering a name. You will the be prompted for a device letter (small or capital, a = 0 = floppy A:, c = 2 = RAMdisk or harddisk C: etc.)

Press any valid keys, e.g. N to see the next part or sector, or S to select the starting point for display. Change to other file (F) / drive (A) / FAT listing (T) / directory listing (D). The S key selects the sector number in A (drive) mode, the byte offset in F (file) mode, and the first allocation unit in T (FAT) mode.

The display format is chosen to fit one sector on one screen.
The characters in dump format (hex plus some characters shown, others represented by a period) are chosen to be printable on most available printers; if you want to see all characters, use character format (I C).

Within directory listings (D) or directory sector interpretation (ID), the flags mean

S = system file
H = hidden file
D = subdirectory
V = volume label
C = written & closed flag (not properly used by GEMDOS)
R = read-only file
also file size and creation date (European format) are given.
In a directory sector, in addition the first AU number and the (unused) flag array is listed.

FAT listings (T) of both 12 and 16 bit FATs are possible. An FAT entry is a pointer to the next AU of a file. -1 means EOF, 0 is an empty AU. Other negative numbers signal bad sectors.
N.B. AU 0 and 1 are reserved, the first data sector is in AU 2.

(Editor's note: The information presented is deemed accurate and the program will work as stated. However, the staff of the Newsletter, officers and the Mid-Florida Atari Computer Club will take no responsibility for any damages that may be incurred by faulty usage of this
program.)

==========
FOR YOUR INFORMATION
==========

Microsoft Corp. apparently now is very near to having a "gold disk" - - the final version of a program sent to manufacturing -- of its much- anticipated Windows 95 operating system.

Completion is "very close," general manager Brad Chase of Microsoft's personal systems group commented as executives gathered in New York to preview the system. "It's just fixing compatibility bugs ... both software and hardware."

Chase is quoted as predicting Windows 95 will break every industry sales record after its launch, still scheduled for Aug. 24.

"It's all compatibility," group manager Russ Stockdale said, "to make sure it works with the broadest base available. This is extremely close to what we will ship."

As noted, Windows 95 has a new user interface replacing its current Program Manager icon where most user applications reside. The Win95 startup screen has new options:

-:- My Computer.
-:- Network Neighborhood.
-:- Recycle Bin (where deleted documents are temporarily stored).
-:- An Inbox.
-:- A sign-up option for Microsoft's online service, The Microsoft Network. The interface also can be customized to include, for example, Shortcut files that are often used.

Another feature is multitasking ability, through a task bar at the bottom of the screen that tells users how many programs are running. Users can click from one program to the next "like switching television channels," Microsoft said.

Noting earlier trade press reports of problems with this feature, Chase said, "There were some bugs in multitasking and there was some misreporting. The multitasking is much better than in Windows 3.1."

Microsoft also plans to offer a program called Microsoft Plus, to take advantage of higher powered PCs, including browser software called Internet Explorer for using Internet's hypertexted World Wide Web area.

Chase declined to specify Microsoft's advertising budget for the up-coming launch, saying only, "Windows 95 will be the largest product ever launched in this industry."

>> Ziff Offers New Internet Magazine <<

To go up against CMP Publications' NetGuide monthly and the new Virtual City magazine Newsweek has announced, Ziff-Davis Publishing Co. says it is launching a new quarterly to be called ZD Internet Life.

Bill Machrone, ZD's vice president of technology and a columnist for its PC Week weekly newspaper, will be editor-in-chief of the magazine.

Machrone commented in a statement that other Ziff-Davis publications, which include PC Magazine and Computer Life, experience a jump in sales whenever the Internet is a cover story and, "while our existing publications can't feature the net in every issue, that is Internet Life's mission."

>> Time Warner Sets SD Operation <<

formed Advanced Media Operations, a manufacturing and marketing unit that will pioneer the production of Super Density (SD) Optical Discs.

The emerging format carries 270 minutes of video in the MPEG II standard, as well as music, interactive games and other applications.

The new unit will manufacture a line of discs for the consortium of 17 consumer electronics and entertainment firms known as the SD-Alliance. These firms have agreed to support the digital video disc format originally developed by Toshiba and Time Warner.

>> HP Offers Medical Handheld Unit <<

The handheld Palmvue wireless mobile unit has been unveiled by Hewlett-Packard Co. to allow doctors to see the vital signs of a patient in an emergency so they could make a diagnosis without having to be at the patient's side.

Reports from HP's headquarters say PalmVue includes patient monitors, its HP 200LX palmtop computer and existing paging technology to link physicians outside the hospital to critical-care patients.

The company said the system is available immediately and is priced at less than $25,000. "The standard configuration includes one dispatch station with modem, five HP palmtop computers pre-loaded with PalmVue OmniCare critical-care application software, an HP LaserJet 4L printer, training and installation."

Also, HP said it will unveil PalmVue ECGstat this fall, an application which will allow cardiologists to receive and review a standard 12-lead ECG, a record of electrical activity of the heart, taken by an HP cardiograph.

>> Microsoft Unveils Mac Titles <<

Microsoft Corp. has unveiled several new multimedia titles for Macintosh computers.

The products include the Microsoft Encarta '95 multimedia encyclopedia; the Microsoft Bookshelf '95 CD-ROM reference library; and Scholastic's The Magic School Bus Explores, an interactive science adventure series. Also in the line-up are The Ultimate Frank Lloyd Wright, an investigation of the noted architect's life and work; 500 Nations, an exploration of Native American culture; Microsoft Wine Guide; and Microsoft Ancient Lands, an examination of lost civilizations.

The titles are scheduled to become generally available between June and this Fall at prices ranging from $39.95 to $99.95.

>> HP Cuts Notebook Prices 20% <<

Hewlett-Packard has cut prices on its notebook computers by up to 20%. This brings the suggested retail price of its basic OmniBook 4000 model down to $2,418. The move aims to match price cuts by several competitors.

Reports say that HP launched its first notebook last fall, joining a marketplace dominated by Apple, AST, Toshiba, Compaq and IBM. At the time, HP said it wanted to innovate in areas where there was growth potential, and that its research showed the small notebook market was

Hewlett-Packard's notebooks contain several innovations including an instant-on, instant-off function that allows the user to turn the computer off in the middle of a document and then turn it back on without losing one's place.

Company officials also said:

-:- Has broadened its family of OmniBook 4000 notebook PCs to match products offered by Toshiba and Compaq.
-:- Is planning a major move into the field of easy-to-use digital devices such as handheld communicators to marry the capabilities of printers and notebook computers. (The firm says it wants to introduce a $300 handheld organizer with telephone, fax and printer features later this year.)

>> New LCD Technology Makes Debut <<

Polaroid Corp. and Motorola Inc. say they have developed a holographic reflective material that can greatly improves the image quality of liquid crystal displays (LCD) used in portable computers and communications devices.

The companies note that their Imagix holographic reflector material improves image brightness and contrast by a factor of two or three and eliminates image degradation due to glare. They add that Imagix has the extra advantage of giving LCDs the appearance of having an internal source of illumination.

"We believe that this is a revolutionary technology for devices that use liquid crystal displays and is an affordable feature in products from watches to laptop computers," says Jeremy Jones, director of Polaroid's industrial products group. "Several leading LCD manufacturers, including Optrex, Seiko Epson, and Seiko Instruments, have been qualified to incorporate this material into their displays."

>> Apple, AT&T Team on Video <<

Desktop video conferencing reportedly will be offered this summer by a joint project of AT&T and Apple Computer.

Reports say that AT&T will offer the service using Apple's QuickTime Conferencing, which lets users of Macintosh computers share information, video and sound with other Macs.

Being able hold a video conference (or share documents) on a desktop PC rather than a larger unit should make the much-hyped business grow more rapidly -- and generate more income.

Dataquest multimedia analyst Kathy Klotz says desktop video conferencing is expected to generate $276 million in revenue worldwide this year, and will grow to $1.04 billion by 1998.

But watch out, Apple. Company is coming. Intel Corp. already has its own desktop conferencing product, Proshare, which connects Windows-based machines. MCI also offers desktop video conferencing.

>> Kasparov Beats the Computer <<

In a rematch in Germany, world chess champion Garry Kasparov regained some respect in cyberspace this week by defeating the computer that beat

The event, heavily promoted by Intel Corp., was held in the Cologne studios of Westdeutsche Rundfunk, the regional radio and television network.

Intel says its processor can analyze more than 100,000 positions per second. Kasparov was under pressure in the first game but came back after the computer, playing black, sacrificed a solid position to gain a three-pawn advantage. The second game was a draw, giving Kasparov the match victory.

Last September in London, Kasparov lost his first clash against the program, called the Premium Chess Genius 2, then could do no better than a draw in a second game. The loss eliminated him from the Intel World Chess Grand Prix, which had a $160,000 grand prize.

In that match, humans held on to the bragging rights. The computer later was defeated twice by India's Viswanathan Anand, who then lost in a sudden-death playoff to Ukrainian Vassily Ivanchuk, another human.

Key Issues
Literary Devices

by Robert A Raymond

Recently, a event (too strange and lengthy to reveal in this column) occurred that resparked my interest in writing. Friends tell me that I have an odd imagination and a distinctive turn of phrase, and that I should consider getting a book out. My first attempt came within a whisker of getting accepted by a publisher, and since I could see a marked improvement in my writing over the length of the book, I started another work, titled 'Tubitz and Mergenstein'. I was just over halfway finished when some life changes halted efforts. Now, several years later, I have decided to finish it.

Of course, everyone is baffled when I tell them that, even though I have a 486, I am writing it on my Atari ST. No doubt I am 'missing' out on the 'power of my PC', as well as 'hampering my efforts' using my Atari. Right?

Well, one man stands between me and a PC-driven Hugo award, and that man is Bill Gates, and his simple, user-friendly system. On my current system (the ST), I have Word Perfect (with a spelling checker and a thesaurus, and a good line-printer (which I just plugged in and it ran fine).

Getting my files over to the PC would be a snap. Did you know that if you format a disk on a PC to 720K (I've only gotten it to work with one-hole disks), you can use them on your Atari. You can also move Ascii files with no problem, and if you leave them in WordPerfect format, they will work fine following a little 'Search and Replace' mission.

So the files are available. What about WordPerfect? What about $150 to $200 for a new PC version. I suppose that they feel that since only businesses would own it, they can charge outrageous fees for it. And since it is so user-friendly, I will probably get about ten thick manuals with it.

So now lets install it. Anyone out there want to guess how many nights it would take to get such a program installed and running fine on a PC? Two or three, maybe? That's 20 or 30 pages of my time.

And now we have to crack open the manuals. Since I am an old

that you see everyone staring at with their heads crooked at the mall are obvious), I figure that there would be a night or two spent figuring out one or two small details. Like how to get it started, or something.

OK, so now I'm down four nights, but I am actually producing work, now. '...Tubitz turned, her eyes flashing in anger. "So, Bob Smith, you have dared challenge me?"...' Let's just print that out. First, we load in all the printer driver software (another night) and goof around getting the printer working just right in WordPerfect (and another night).

So that's six nights of work. Since I set aside two nights a week to write, given my schedule, that's three weeks shot.

Thanks, Bill, but no thanks.

1450XLD Memory Upgrade
Upgrade your 1450XLD to 320K
by: Brian Jones

Technical Assistance
John Hardie

Based upon the 65XE/320K Upgrade
by: Scott Peterson

The Atari 1450XLD was originally designed to be the flagship of the Atari XL line of home computers. Unfortunately, it was never publically released for sale. In its original configuration it contained:

- 64K Ram
- Internal DS/DD Disk Drive
- Internal 300 Baud Modem
- Internal Speech Synthesizer (Excellent!)
- 1200XL style Keyboard with Function Keys F1-F4 and LED's
- Parallel Bus Interface for the 1090XL Expansion System

Internally, the circuitry of the 1450XLD is very similar to the XE series of computers in that it contains the FREDDIE chip used in the XE's for Ram access. Few modifications to Scott Peterson's original 65XE/320K upgrade were necessary to get it to work on the 1450XLD. So before we get down to business, let's get the usual disclaimer out of the way.

DISCLAIMER Installation of this upgrade is done at your own risk. We guarantee the information that follows to be technically correct to the best of our knowledge.

On with the good stuff... To perform this upgrade you will need the following tools:

- Low wattage soldering iron (15-25 watt)
- #2 Philips head screwdriver
- Small Flat-blade screwdriver
- Fine tip needle-nose pliers

The chips on the 1450XLD motherboard should be socketed, so there should be no need for any de-soldering.

- Z1 74LS158
- Z2 C025953 (Atari Custom Chip, stocked by Best Electronics)
- Z3-Z10 256K Dram (150ns) [41256]
- R1-R3 33 ohm resistors
- XZ1-XZ10 (10) 16-pin sockets
- 30 gauge wire (Radio Shack #278-501)
- Electrical tape

First, remove all the 64K Ram chips from their sockets. Solder a 16-pin socket to the top of each Ram chip. Take one of the two remaining sockets and bend up all of the pins except 8 and 16. Now solder this socket to the top of U21 (74LS138) and replace U21 into the 1450XLD.

Take the last 16-pin socket and bend up pins 1, 2, 3, 4, and 15. Clip off pins 5, 6, 7, 9, 10, 11, 12, 13, and 14. Solder this socket to the top of U46 (74LS123). Replace U46 into the 1450XLD.

Remove U25 (FREDDIE - C061922 or C061991) and bend up pins 23, 24, and 35 and replace U25 in its socket.

Remove the motherboard. On the bottom of the motherboard, jumper together all pin one's of each 64K Ram chip socket.

For the remainder of the upgrade, be extra careful that the pins that were bent up are straight and not touching anything and that you don't accidentally short any pins/wires or what-not together. When cutting the jumper wire, strip back the minimum amount of insulation necessary to tin the wire and make contact. Also, measure the wire so that it is not stretched tight between connections. There should be excess insulated wire so that it is loose when it is soldered to the pins of the sockets. It should not strain, pull, or bend any pins on any sockets or chips.

On each 256K Ram chip bend up pin 15 and plug it into the sockets which you soldered to the tops of the 64K Ram chips. Jumper the pin 15's of each 256K Ram chip together using the wire. Prepare three jumper wires by measuring the correct lengths needed for the first 3 connections listed below, cutting them in half, and soldering each half to one end of one of the 33 ohm resistors. Your jumper wires should look like this:

```
-----------[[-]]-----------
     ^        ^        ^
   wire   resistor   wire
```

Wrap the resistor connections in electrical tape.

Let's call the socket soldered to U46 (74LS123) - XZ1 and the socket soldered to U21 (74LS138) - XZ2. Connect the resistorized jumpers accordingly:

XZ1 pin 4	-R1-	U45 pin 1 (bottom of board)
XZ2 pin 11	-R2-	U45 pin 15 (bottom of board)
XZ2 pin 10	-R3-	Any 256K Ram chip pin 15

Connect these remaining jumper wires:

XZ1 pin 15	-	XZ1 pin 8
XZ1 pin 1	-	U26 pin 30 (CO14805)
XZ1 pin 2	-	U2 pin 13 (6520)
XZ1 pin 3	-	U2 pin 16
XZ2 pin 3	-	U2 pin 12
[illegible]		

```
XZ2 pin 9    -   U17 pin 9 (C012296 or C021697)
XZ2 pin 1    -   U18 pin 17 (74LS244)
XZ2 pin 2    -   U18 pin 2
XZ2 pin 6    -   U25 pin 35 (C061922 or C061991)
XZ2 pin 12   -   U25 pin 23
XZ2 pin 13   -   U25 pin 24
XZ2 pin 15   -   U25 pin 5
XZ2 pin 14   -   XZ2 pin 16
XZ2 pin 7    -   XZ2 pin 8
```

Plug the 74LS158 into XZ1 and the C025953 into XZ2.

This completes the memory upgrade. This upgrade can easily be reversed by simply unplugging the 74LS158 from XZ1 and the C025953 from XZ2 and plugging back in pins 23, 24, and 35 of U25.

A few last notes... The upgrade is a tight fit. The modem card can be slipped off during installation and put back on when you're finished. To get the keyboard to rest evenly on the case it might be necessary to clip the plastic screw support under the front right-hand corner of the motherboard with wire cutters.

Any software compatible with Scott Peterson's 65XE/320K upgrade should work fine here also, although we haven't done a lot of software testing at this point other than with SpartaDos 3.2D.

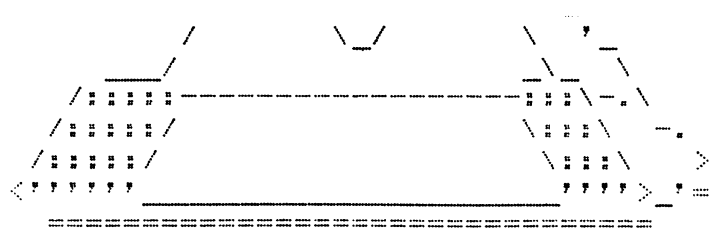
Best Electronics is probably the best supplier of Atari parts around. You can reach them at 1-408-243-6950

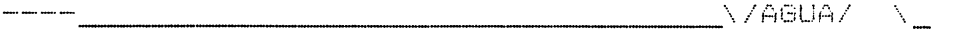
(Editor's note: This article is an excellent work and if you have a 1450XLD, please let the editor know as we would be greatful and excited to learn of this rarity.

HOOVER STRIKE

(Editor's note: This article and review is contributed by Gale Kindstrom.)

By Jeff Pruett





Hover Strike

$59.95 MSRP

By : Atari

Rated : KA (6+)

Type	3D Shooter	Size	16 Megabits
Environment .	3D Polygon 6-directional with vertical panning *	Levels	36+
		Players	2 player (CoOp mode)
Color	16 bit		
Effects	Light Sourcing (Multiple, Moving Light Sources)		
	Texture Mapping		
	Gouraud Shading (Light Sourced Gouraud Shading)		
	Depth Cueing		
	Animated Landscapes		

OPTIONS

* In-game Music and FX volume control
* Save Game feature
* Button Configuration Control
* Difficulty Control (Three Levels)

Overview : On a the fringes of Federation space a planet has been invaded by the evil Terrakian Pirate Clan. The Terrakians have set up factories on the planet that process human corpses to extract valuable organic compounds (eeeewwwwwww... =) Poor colonists...

So why doesn't the Federation just come in and rescue them? Because the Terrakians have a massive Wicked cannon that will blow the Holy Crap out of the Armada before it even gets close.

So the Federation is sending you alone in an Ultra high tech Hover Fighter to eliminate the Cannon and blow up all the factories to save the poor hapless colonists from getting munched by the Terrakian factories.

Well, this game should finally put to rest those nasty rumors about the Jaguar not being able to do Texture Mapping well...

Full 3D perspective. You look in the same direction as the terrain you're on, so your view can pan up and down. If you are coming down a slope, you are looking twords the ground. This can get confusing at times, especially if you're getting hit a lot or are on Water (yes, the water moves! =), but it does make it more realistic. Lots of polygons, so the landscape is very detailed, though not as much as Cybermorph. The Cockpit design is decent, and there is an option for an external view (with boarders).

The environment looks very similar to Shockwave on the 3DO. Everything is texture mapped; and the whole landscape is depth cued. The textures on the landscape are well done, if a bit monotonous (The Jaguar has less Ram than the 3DO for storing textures). However the enemies are very well mapped and at high resolution so the pixelation is almost non-existant. The textures between levels are varied a great deal though, so that every time you pass a level you get new textures. There is a background pic in the game as well which is useful for getting your bearings...

There are levels with Water; moving textured polygons that undulate like actual waves (Your tank will bob with the waves while on water). Actually there are many types of liquid terrain ranging from Water to Slush to Hot Lead and Lava (and others). The Lava flows were the coolest looking I thought.

The night levels are the most striking though; The Depth Cueing is increased to the point where visibility is almost 0 (though not quite). As you fire weapons or flares the landscape ITSELF is light sourced around them. You can have literally DOZENS of light sources, all zooming around the landscape with zero slowdown on the game. This technique is quite impressive, and I don't think I've ever seen it done anywhere else. Oh yeah, there is no texture mapping on this level; everything is Gouraud Shaded instead (and quite well too).(If people are wondering what the Jaguar's hardware Z-Buffering is for, well, this level will show you).

When you complete a mission you are treated to a cool little cinema of your drop ship picking you up. The one on the Night level is my favorite. When you die you get another cool cinema of the Armada attacking the planet and getting destroyed (this one looks REALLY cool; very smooth. I thought it was an FMV thing at first. In demo mode it shows the Textured ships rotating at an ultra-smooth 30fps. You also get a little mini-cinema when your ship drops you into the mission. You can skip all the cinemas by pressing the fire button.

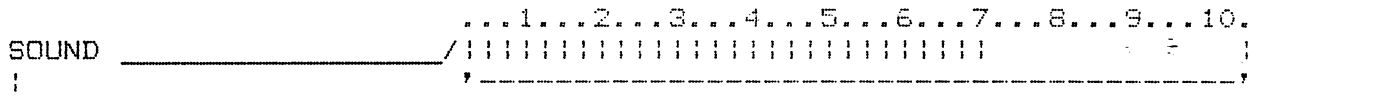
PLAY MECHANICS ...1...2...3...4...5...6...7...8...9...10.

It's a Texture Mapped Cybermorph, just like Shockwave was. The main difference is that you're in a tank, and that your prspective can pan up and down with the terrain. You run around shooting stuff. Decent choice of weapons, but could have used more variety like in Cybermorph. You have an auto-lock feature, useful if you want to target an enemy that is out of visual range. Mortars for long range. Guided Missiles (which you need to conserve), very useful for problem situations when you are bouncing all over the place in the middle of a bunch of enemies. Normal missiles, which are basically

There are 36 missions, divided into six levels (again, sort of like Cybermorph). You get the same variety of missions in each level (one night mission, one ice mission, ect...). Like I said, the textures vary with the level, so you don't see the same landscape every time. I'm still not sure how they crammed all these high-res true color textures into a little bitty 16 megabit cart, but...

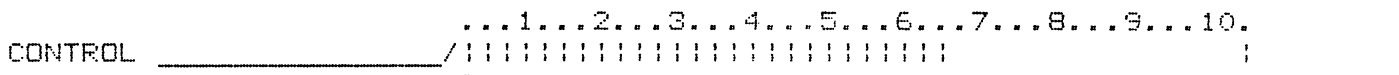
The enemies are pretty cool too. Very Star-Wars-esque, with Floaters (like assassin droids), Hover Tanks, Fighters, Walkers (Like the Scout-type ATAT's in Star Wars), and lots others. Nice design and lots of variety. The objects are equally detailed, and some of them are animated. There are also passive annoyances like mines and such. The Walkers are a real bitch; when you blow up the body the head separates and continues to attack you!

Cooperative mode is pretty cool. One guy navigates while the other controls the weapons sysems. Just make sure you have a competent partner.



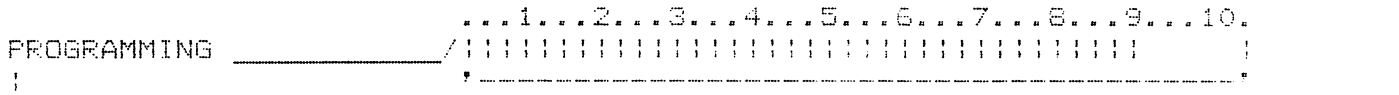
The computer voice was cool. Other than that the sounds were middle of the road. A Mod plays during the game itself. Nothing spectacular, but it didn't grate on my nerves like the Wolf 3D and DOOM music did, so thats saying something right there.

The Mods were pretty decent. The sound effects were acceptable. But don't expect another Tempest.



The magaznes exaggerated; the control is not that bad. You can easily accellerate or stop whenever desired. What I think they complained about was the ship's inertia. This thing acts like a "real" hovercraft. You can't just turn on a dime like you would a car. It slides around a bit, because you are riding on air and there is no friction.

So does this mean control is a bitch? Not at all! After about half an hour I had mastered the controls and could navigate narrow ledges with little difficulty. The controls are not nearly as intuitive as, say, Iron Soldier's were. Or DOOM. But they work fine. EGM reported that there is no reverse thrust. EGM wuz wrong. It works like a car though; you have to "shift" it into reverse. It's a pain, but it can be done. The "C" button stops you immediatly (along with some sound effects like escaping air...). You can turn in any direction immediatly and accellerate again. This is how I usually moved around, but a Reverse Thrust option is there if you want to use it.

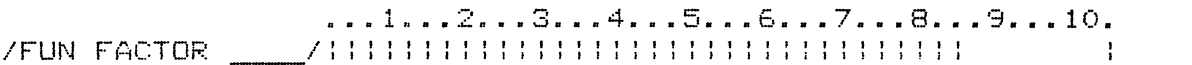


This [illegible] is acceptable, but could have been [illegible]

is fine; no problem doing 360's when someone is attacking you. It doesn't take forever to turn around. I'm guessing in the 11-13fps range. I did not see any bogging what-so-ever, no matter how many enemies were on the screen or how much stuff was going on.

Other than that these programmers deserve some credit for really showing off what the Jag is capable of effects-wise...some very original stuff here. The up/down panning was nice, but I would REALLY have liked to be able to pan the view myself (a'la Iron Soldier).

OVERALL/FUN FACTOR



I don't know how most Jaguar owners will react to this game, but I myself had a blast with it. If 3D shooters are your thing, and you liked Cybermorph, go and pick this one up now. The control might throw you off at first, but give it a chance. It does work. You just have to get used to being in a HOVERcraft, and not an airplane or car. No, it is not another "Checkered Flag". Once you get a grip on the controls, moving around is no problem.

If nothing else this game has stretched the Jaguar's capabilities quite a bit, and really shown the potential of the machine. I don't think it's a sysem seller, but it's a good solid game. A welcome addition to the Jaguar's library.

CREDITS

Main Coding	Denis L. Fung, Cary Gee, Craig Suko
Additional Coding	Eric Smith, Rob Zdybel, Hans Martin Krober, Dave Staugas
Graphics	Chris Thompson, Ed Pearson, Donald Wang, Ken Saunders, Keoni Los Banos, Jennie Birch
Level Design	Hank Cappa, Tal Funke-Bilu, Scott Hunter, Harry Kinney, Joe Sousa
Music and Sound FX	Brad Wait
Computer Voice	Erin Carson
Producer	Leonard Tramiel

The SpartaDos Cartridge:
A Review

by Keith Joins

(Special thanks is given to Bill Aycock, another beta tester, for his work in editing and correcting this review and for adding his comments on some features I had failed to cover.)

By the time you read this the SpartaDos X cartridge, a long awaited release from ICD, should be on sale. The people who brought us the MIO, the US doubler, and the disk-based version of SpartaDos have now given us a DOS so fast and powerful that once you use it, you will never want to replace it with any other DOS currently Available. After having used SDX for over two months while beta testing it, I can't understand how I ever survived without it.

The cartridge itself is similar in appearance to the R-Time 8. It is easily opened so that you are able to replace the socketed ROM. This is a fairly simple procedure. I have done it twice and if I can do it, anyone can. This will be the method used for any future upgrades--no soldering, thank you!

The cartridge allows for piggy-backing another cartridge, such as the R-Time 8, Action!, BXE, MAC-65, etc. I am using it with a MIO and the XE adapter. Tom Harker of ICD has said that they are looking into manufacturing some type of adapter for the XL to avoid the need to stack as many as three cartridges in the XL slot.

The cartridge is packed with 64K of code. There is no disk needed with SDX as all of the external command files are resident in the cartridge and load with amazing speed. The DOS is totally relocatable! The need for this will become apparent as you become familiar with SDX. It is this relocatability that has caused the long delay in completing SDX. Anyone who has ever tried to write an application program that is relocatable, let alone a system program, can appreciate the magnitude of this project.

Now let's take a look at some of the new features of SpartaDos X. Something that you have to learn at once is that there is now a new set of identifiers. The first one you learn is CAR:. This is the cartridge itself. We can issue the command DIR CAR: and get a directory of the cartridge as follows:

```
Volume: Cart 4.0
Directory: MAIN

SPARTA   SYS   7072  8-24-88  4:01p
MENU     COM   6688  8-25-88 12:01p
COMMAND  COM   4723  8-25-88 12:03p
INDUS    SYS   2498  8-11-88  5:09p
ARC      COM   3283  8-24-88  5:26p
X        COM   1999  8-24-88  4:01p
ATARIDOS SYS   1815  8-24-88  4:02p
CAR      COM   1600  8-24-88  4:01p
CACHE    SYS   1224  8-23-88  9:53a
UNERASE  COM   1056  8-24-88  9:55a
TD       COM   1016  7-22-88 12:07p
RAMDISK  SYS   1048  8-19-88  4:56p
SIO      SYS    970  8-16-88  5:34p
FIND     COM    831  8-25-88 12:53p
CLOCK    SYS    688  7-22-88 12:18p
```

```
DUMP     COM     567  7-26-88 11:41a
KEY      COM     505  7-19-88  8:42a
CHTD     COM     372  7-26-88 11:47a
CHVOL    COM     298  7-12-88  9:10a
RPM      COM     388  8-25-88  1:50p
RS232    COM     147  7-07-88  3:59p
      0 FREE SECTORS
```

Remember that this is the beta version and the directory entries might be different on yours, but not much. A number of the .COM files will look familiar to seasoned SpartaDos users. These are the 'external' commands and they have the same functions in SDX as they did in the disk-based version.

The next new group of identifiers used is A: through I: (or 1: through 9:), which represent drives one through nine. DSK is now the identifier for the old D: and is always assumed. Therefore D: is no longer the default drive, but rather is drive four. So, you can reference drive one as 1:, D1:, DSK1:, or A: -- your choice. The default drive is now just a colon (:) since a single D preceeding a letter or a number is ignored.

Other identifiers are PRN: (the printer), CON: (the "console", or screen editor), and COM: (the RS-232 port).

This takes a litle getting used to but becomes second nature after a bit. Any MS-DOS users will feel right at home. I learned CON: very quickly when attempting to create my first AUTOEXEC.BAT file (not STARTUP.BAT -- more MS-DOS compatability). I kept on trying to use the command:

```
COPY E: AUTOEXEC.BAT
```

I'll let you figure out what happened!

These new identifiers can be accessed from Basic by preceeding them with a 'D'. LOAD "DF:FILENAME" will load filename from drive six. Of course you could still use LOAD "D6:FILENAME" also, so there's no problem with compatibility.

If you take a look at the CAR: directory again, you will see some files with the extender ".SYS". These are handlers that you can choose from to configure your system the way you want. SDX will load several of these as a default configuration. SPARTA.SYS and SIO.SYS must always be loaded as they contain the actual SpartaDos disk driver and the SIO routines. The default configuration will also always load ATARIDOS.SYS and INDUS.SYS. ATARIDOS.SYS will allow you to access AtariDos type disks. INDUS.SYS will re-program any connected Indus or Happy-enhanced drives to enable high speed I/O. I have an Indus GT and this handler works great!

RAMDISK.SYS is the SDX ramdisk driver. You may install multiple ramdisks using any unused drive numbers in any size up to the total amount of available banked RAM. You specify the size of the ramdisk by entering the number of 16K banks to be used. For example:

```
RAMDISK.SYS 8 2
```

This will set up a ramdisk as drive eight using 2 16K banks of RAM. The ramdisk will be formatted automatically unless you had previously installed the ramdisk with the same number and size before performing a coldstart and without losing power to the RAM. This means that you can use the COLD command which re-boots the system and still retain the contents of your ramdisk. By the way,

CACHE.SYS, when installed, will use one 16K bank of extended RAM to add additional buffers to SPARTA.SYS to make floppies seem to run faster. This handler is not loaded as a default.

CLOCK.SYS and JIFFY.SYS are loaded dependent upon your system. If you have a R-Time 8 then CLOCK.SYS will load. Otherwise JIFFY.SYS will load as the default. One or the other must be used to give meaning to any Time/Date commands.

Each of the handlers except INDUS.SYS takes up memory. Therefore you don't want to use any that aren't needed. To do this you can set up a configuration file of your own. When SDX boots it will check drive one for a file called CONFIG.SYS. If the file is present, SDX will use that file for the list of handlers to load. If there is no CONFIG.SYS file, then the defaults will be used.

Booting with OPTION held down will override any disk-based CONFIG.SYS file and will use the default configuration.

You can also choose what area of RAM SDX will use. The choices are OSRAM (RAM under the OS which is the default on a stock XL/XE), BANKED (expanded memory), or NONE (normal RAM which would usually be used only with a stock 800).

SpartaDos X now supports over 1,400 entries in a directory, a real blessing for hard disk users. There are now two valid directory name separators; the usual ">" has been joined by the MD-DOS"\". Also, SDX recognizes the MS-DOS MKDIR, CHDIR, and RMDIR commands, which are equivalent to the old style CREDIR, CWD, and DELDIR. Note that the longest pathname allowed is still 63 characters.

There are several new commands available with SpartaDos X. The first of these is the ATR or Attribute command. This is really an enhancement of the old PROTECT and UNPROTECT commands which set or cleared a protection bit in the filename entry. The protection bit is now manipulated by the ATR command. You would use ATR +P FILE.EXT to protect a file, or ATR -P FILE.EXT to unprotect it. In addition, two new bits are available: the Archive bit and the Hidden bit. The Archive bit is cleared when a file is created or written to, and set when the file is backed up by a backup program, such as ICD's FlashBack!, which supports it. The Hidden bit allows you to hide a file or directory so that it can be loaded as a command only. Commands like DIR, COPY, and TYPE will not 'see' these files unless you specifically include the attribute with those commands.

The RUN command has been eliminated, the thinking being that it was never used except to re-boot the system (with RUN E477). To take the place of this, the COLD command has been added. COLD by itself causes a reboot. There are also two options, C and N, which disable SDX and allow you to boot up a disk-based DOS such as Atari DOS or an older version of SpartaDos. COLD /C will re-boot the system and leave an attached cartridge enabled, and COLD /N will disable all cartridges and reboot the system.

Users of SpartaDos will remember that you used the CAR command to return to the built-in Basic on your XE/XL or to the cartridge that you had installed. Since SpartaDos X does not dump you into Basic when it boots up but rather ends up at the DOS prompt, and since it can have another cartridge installed in it, you have two different commands available. The BASIC command will take you to the internal basic on the XE/XL machines. the CAR command will take you to whatever cartridge you have plugged into the SDX cart. In order to return to DOS without losing anything in the editor of whatever

your CONFIG.SYS file or from the DOS prompt.

The form for this is SET CAR=Dn:filename for the cartridge and SET BASIC=Dn:filename for basic. (The SET command is used to set various environment variables, of which CAR and BASIC are two.)

While this feature may seem to be a regression, it is necessary due to the relocatable nature of the DOS.

CAR and BASIC are automatically set to I:CAR.SAV and I:BASIC.SAV when you boot up. You can change these assignments, but you also have the option of deleting them. If these variables do not exist, then the memory save feature will be disabled and either Basic or the cartridge will be entered cold. When calling DOS from either Basic or the cartridge you will be given a warning if the memory save cannot be completed, so you can save whatever you are working on to another disk first.

I must admit that at first I did not care for this feature. However using a ramdisk for this file makes the delay in saving and reading almost unnoticable. It also allows you to go from DOS to internal Basic to a cartridge without losing anything in memory! I have found it to be well worth the small delay it causes.

You can enter the cartridge or internal BASIC with the CAR and BASIC commands. Both these commands allow you to specify a filename with any needed parameters. The binary file so named will be run when the cartridge or Basic is entered. This is how, for example, you would run a compiled Action! program that requires the cartridge library.

Several other environmental variables are available that you can set with the SET command. One of these is the DOS prompt. You can specify the format of your prompt by using certain "meta" characters. The letters L, N, P, D, T, and R, preceded by a dollar sign, will be replaced by the drive Letter or Number, the current directory Path, Date, Time, or a Return. You can also use an underline, which will be replced by a space. For example, "SET PROMPT=$L:" will give you a prompt of A: for drive one. If you are in the GAMES directory on drive one, you could "SET PROMPT=T_DN:>$P>" and your prompt woud look something like this:

  11:25:42am D1:>GAMES>

The normal Dn: prompt is set up with the command "SET PROMPT=D$N:".

PATH can be set to cause other directories to be searched when a command or file is not found in the current directory. Entering PATH with no parameters will show the current search path. Note: the search path is NOT the same as the current working directory! To see what your current directory is, enter CWD (or CHDIR, or CD) with no parameters. This takes the place of the ?DIR command from earlier versions of SpartaDos.

The FORMAT command presents a menu type screen and allows you to format a disk in any density you want. You can use the high speed skew for the new XF-551 drive, the US skew for the Indus or a doubled 1050, or a standard skew. You can format the disk in either Sparta mode or Atari mode. The Atari mode allows you to use enhanced density if you should so desire. This formatting menu shows up whenever a format-disk command is issued -- even from within a program!

The FIND command will search all connected drives and all directories for the specified filename. Wildcards are of course

file to the screen.

drive number in the filename.

The keyboard buffer is not loaded as a default. You must select KEY ON to load the file from the cartridge and activate the buffer.

Subsequent KEY commands will toggle the buffer off and on.

The LOAD command has the same effect in SDX as in the disk-based version of SpartaDos. This will load a file but not run it. However, you can also use it to load an external command file to keep it resident in memory. The COM files in the cartridge are loaded each time they are called. You could load one or more of them into memory with the LOAD command and they will stay there until you use LOAD with no parameters, which will remove all non-installed programs from memory.

The SWAP command will allow you to swap your drive configuration. SWAP 1,8 would swap drive one with drive 8. SWAP with no parameters will display the current drive map. MIO users should take note that the MIO menu swap configuration must be considered when using this command.

The X command is used to load and run those programs that require all cartridges be removed. Express, Determ, Textpro, Discom, and the disk-based ARC are examples of programs that must be called using the X command.

A couple of nice features are the PEEK and POKE commands. These work pretty much like the Basic commands except you don't need the comma to separate the address and the value in the POKE command. Also, you can enter the address and value as either decimal or $hex numbers. These two can come in very handy at times, believe me! For example, my AUTOEXEC.BAT file contains the commands POKE 82 0 and POKE $2DA 2 to set the left margin and cursor repeat rate as soon as the system is booted.

Another command that is nice is CLS for clear screen. This is good for some programs that exit to DOS leaving you with a screen full of the program remnants. There is also an RPM command, which allows you to easily check the speed of your disk drives. (The standard speed for an 810 or 1050 drive is 288 rpm. My Happy drive registers about 900 rpm, and an MIO ramdisk clocks in at around 23000!)

The next feature I will cover is one of the most impressive. SpartaDos X contains a licensed ARC program that will also handle Alf-Crunched files. Here is the format and commands used:

```
     SpartaDOS X  ARC ver 1.1

 Usage:      ARC cmd[opt] arcfn [flist]

 Where "cmd" is one of:
  a    : add file(s) to archive
  m    : move file(s) to archive, then
         delete from current location
  u    : update file(s) in archive,
         keeping the newest versions
         (according to the time/date
         stamp) and adding any source
         files from flist that aren't in
         the archive
  f    : freshen file(s) in archive,
         keeping the newest versions but
```

```
  d    : delete file(s) from archive
  x,e  : extract file(s) from archive
  p    : print file(s) to screen
  l    : list file(s) in archive
  v    : verbose list of file(s)

 Valid "opt" options are:

  b    : retain backup copy of archive
  s    : suppress compression
  w    : suppress warning messages
  n    : suppress notes and comments
  h    : high speed (screen off)
  g    : encrypt/decrypt archive entry
         (followed by password - must
         be the last option, as in ARC
         AHGtwister TEST.ARC *.*)

 "arcfn" is the archive filename
(drive, path, and ext are optional).

"flist" is the list of files to
extract, add, list, etc. in the
archive. Wildcards are allowed in each
filename. "*.*" is assumed if no
filename is given.
```

This is a fully featured ARC as you can see, and works the same way as the ARC utilities for IBM and ARC.TTP for the ST. It is also extremely fast! The first time I used it to unarchive a file I thought it must not have worked properly since it finished so quickly.

The program will automatically determine whether a file is in ARC or Alf-Crunched format when extracting files, and when compressing will use the most efficient ARC format it can. Anyone who is a frequent downloader of programs that have been compressed will really like having this program always just a command away.

Most other commands remain the same as they were in the disk-based version of SpartaDos. Some have additional features such as DIR and TYPE. They can each accept some optional parameters. Remember the discussion of the ATR command? The Attributes can be included with these commands. DIR +S will show only subdirectories. DIR +H will show hidden files. You can also use a /P or /C. with DIR. DIR /P will pause the display and wait for a keypress after giving you a full screen of filenames. DIR /C will give you a count of the number of entries in that directory. DIR /PC will do both. TYPE can also use the Attributes and the /P. Also, TYPE is no longer limited to text files with 64-character lines. You can now TYPE any file to the screen.

PRINT has been dropped and the entire I/O re-direction scheme has been changed. Batch files are only read by the command processor and cannot input information into a Basic program since they are no longer system wide. You can divert output of a single command by using >> such as DIR >>PRN:. This would redirect the directory display of drive one from the screen to the printer. DIR >>A:FILENAME would direct the display to the file on drive one.

Similarly, you can use <<A:FILENAME to specify input from a file instead of the keyboard.

An I-Cloud enhanced Translator X looks for a file called

include any system set up commands you need (like the POKEs mentioned above).

You can execute a batch file from the command processor with the -filename entry. You can also pass parameters to the batch file. As an example let's suppose that you have set up your MIO ramdisk as drive one but that you frequently want to change the file that you are using as your CONFIG.SYS. You have a floppy in drive two that has a library of CONFIG.SYS files named FILE1. FILE2, etc. Here is our batch file, named CHANGE.BAT:

```
COPY %1 %2
COLD
```

Now we would execute this batch file as follows:

```
-CHANGE B:FILE1 A:CONFIG.SYS
```

This would copy FILE1 from your library of CONFIG.SYS files in drive two to drive one and re-boot the system using the new CONFIG.SYS file.

This is not the best example in the world but it does give you an idea of what can be done. You may pass a total of nine parameters to the batch file.

While speaking of batch files and CONFIG.SYS files, a nice feature in creating and editing these files is that COPY CON: does not clear the screen as COPY E: does. You can TYPE the file out, issue a COPY CON: CONFIG.SYS, move the cursor to the display of the file and edit what you want while hitting RETURN after each line, and then press CONTROL-3 to close the file. This can be a real time saver when setting up various CONFIG.SYS files.

And now a note to TURBO BASIC users. You can now use TB with SpartaDos! However you will need an expanded memory system since you must load the handlers into BANKED memory. That will leave the RAM under the OS available to TB. While I haven't tried it, it might be possible to load the handlers into normal RAM and run TB on a stock XL but it would drastically reduce the memory available for any programs to use.

Well, this has been a brief overview of the SpartaDos X cartridge. In my opinion it is well worth the long wait. While there still could be bugs lurking around in SDX somewhere, if they are there they are extremely subtle. The only problem I can see will be the occasional program that is not compatible with SDX. In the course of beta testing we've found a few such programs, but ICD has quickly remedied this.

Whatever you do, don't miss this one!

(Editor's note: With the resurgence of valued 8-Bitters in our Club, this article on the Sparta-Dos Cartridge is timely.

TO DROP OUT OR NOT TO DROP OUT

(A Surge Protector & Auto Reset Device)

By John Waters, MFACC

powerout surges. The trouble with that circuit was that it had to be manually reset after a power outage. If you used it with a newer programable VCR or TV, for example, you would lose all of the programmed settings if the power was out for any length of time. In this instance, all of the memory circuits would have to be reprogramed and if you have ever done this, you know that it is not one of the favorited things to do in life.

This new circuit incorporates a MOV surge protector, plus a time delay, which will automatically reset a relay after a pre-determined time elapsing. The time delay is determined by a Capacitor "C4" and please note, the smaller the "C4" Capacitor, the shorter the delay. The size shown in the accompanying schematic is set for a one (1) minute delay. I have set my unit to delay fifteen (15) seconds. The "R6" line control is adjusted to drop out if the line voltage should drop to 95 - 98 volts to protect any unit against low line voltage.

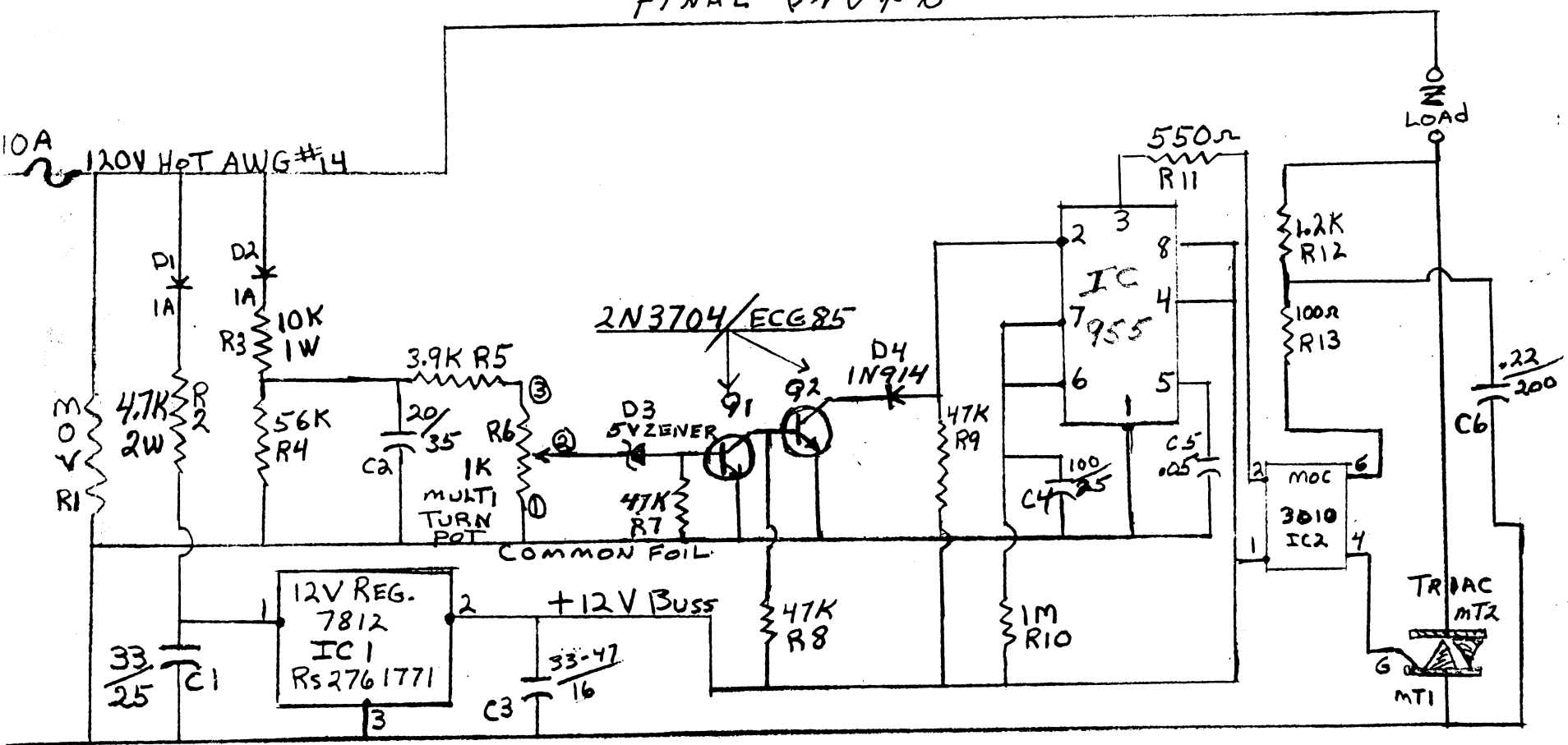
This is a simple and easy to device to make and it can be constructed on a small proto-board. All parts shown in the schematic are available at Radio Shack and are inexpensive.

I am also including an alternate circuit (schematic #2) which can be used with any large unit, such as a Freezer, Refrigerator, Microwave, etc. Please note; this circuit is a HOTLINE type and should NOT be used with electronic equipment that should be isolated from the line. If you should desire to use the second circuit, shown in schematic #2, the output from the IC 555 may be coupled to a relay, as in the first circuit, thereby eliminating the MOC3010 and the TRIAC. The parts for this circuit are also available at Radio Shack.

(Editor's note: John Waters is a very fine and long standing member of The Mid-Florida Atari Computer Club and an electronics wizard. All information contained in this article is proven and will work, however, no responsibility can be assumed by the author, Newsletter staff, officers or The Mid-Florida Atari Computer Club for damage that may be incurred by anyone using this information.)

TRANSIENT SUPPRESSOR AND BROWNOUT PROTECTOR

"FINAL DRWNG"

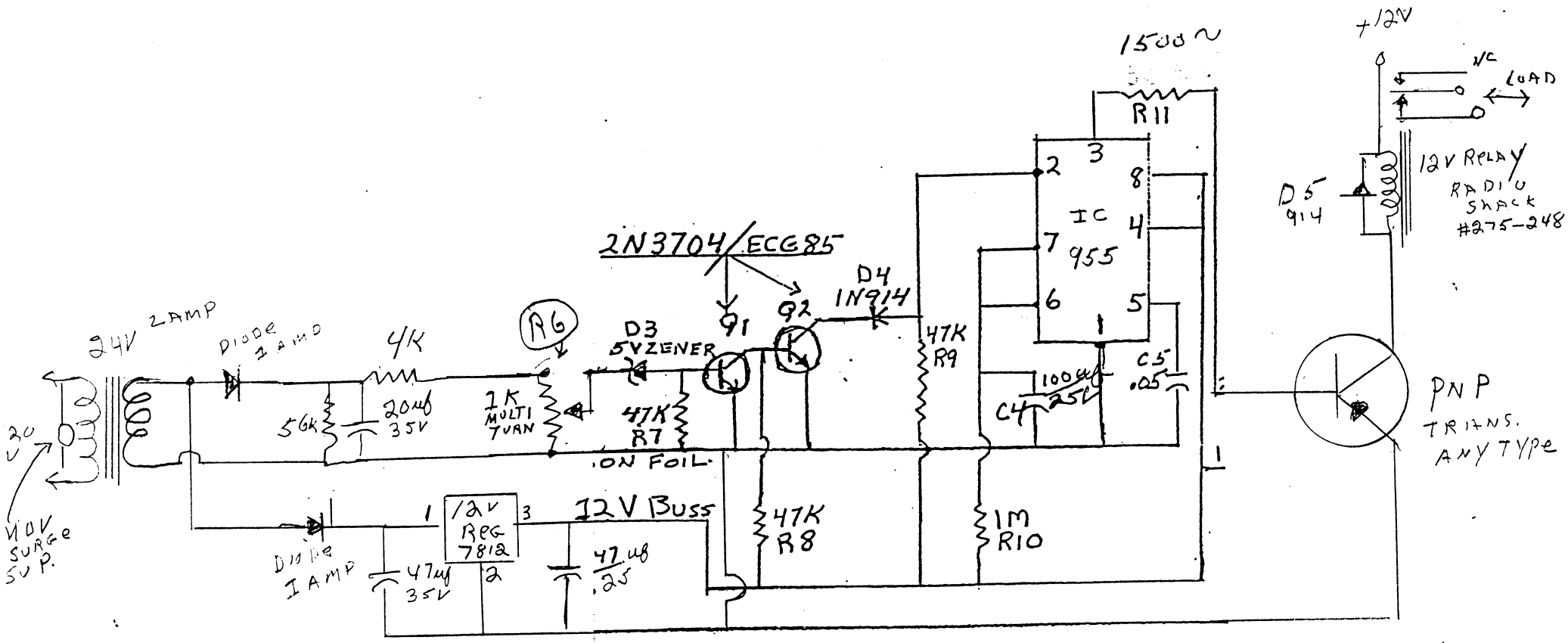


NOTE: ALL RESISTORS ¼W UNLESS OTHERWISE NOTED.

SET POT. SO LOAD DROPS OUT AT @ 100VAC.

TRIAC RATED TO HANDLE LOAD. USE APPROPIATE HEATSINK

TRANSIENT SPIKE SUPPRESSOR AND BROWNOUT PROTECTOR + TIME DELAY



NOTE:
RELAY CLOSES WITH POWER ON AFTER DELAY OPENS CLOSING CONTACT ENERGIZING LOAD

NOTES:

ALL RESISTORS 1/4 W

ADJUST (R6) FOR LINE DROPOUT AT 95-98 VOLTS